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Indian Standard
SPECIFICATION FOR MAIZE STARCH, COTTON TEXTILE INDUSTRY
(Second Revision)

(Second Reprint DECEMBER 1993)

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BUREAU OF INDIAN STANDARDS
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NEW DELHI 110002

Gr 3 *February* 1978

Indian Standard
SPECIFICATION FOR MAIZE STARCH, COTTON TEXTILE INDUSTRY
(Second Revision)

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Indian Standard
SPECIFICATION FOR MAIZE STARCH, COTTON TEXTILE INDUSTRY
(Second Revision)

0. FOREWORD

0.1 This Indian Standard (Second Revision) was adopted by the Indian Standards Institution on 10 October 1977, after the draft finalized by the Textile Sizing and Finishing Materials Sectional Committee had been approved by the Textile Division Council.

0.2 While finalizing this standard, the Committee decided to prescribe the requirements of viscosity separately by using Redwood Viscometer and Brook-field Viscometer. Since the relation between the values of viscosity observed by using these two methods is yet to be established, the requirements prescribed in this respect are tentative only.

0.3 To familiarize the industry with International System of Units (SI Units), the basic SI Units as well as the recommended SI Units for use in the textile industry are given in Appendix A.

0.3.1 Standards of Weights and Measures Act 1976 also stipulates use of SI Units.

0.4 For the purpose deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS : 2-1960*. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

1. SCOPE

1.1 This standard covers maize starch used in the textile industry (mainly cotton) as a sizing and finishing material.

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*Rules for rounding off numerical values (*revised*).

2. REQUIREMENTS

2.1 Physical — The maize starch used as a textile sizing and finishing material shall meet the following physical requirements:

Characteristic	*Requirement*	*Method of Test, Ref to*
Identification	To compare favourably with the photomicrograph given in Fig. 1	IS : 4706-1968*
Particle size	To pass through 180 micron IS sieve	
Cold water soluble	0·40 percent, *Max*	
Viscosity at 75°C	30 seconds, *Min*	

NOTE 1 — The above mentioned requirements in respect of viscosity are on tentative basis only.

NOTE 2 — The method for preparation of paste for viscosity determination shall be as follows when Redwood Viscometer is to be used:

Weigh 4·0 g of the dry material. Add this to a beaker containing 200 ml water, with continuous stirring. Weigh the beaker and the stirrer along with its contents. Keep the beaker in a boiling water-bath and cover with a plastic plate. Stir this with the paddle type mechanical stirrer at a speed of 45 to 50 rev/min. After one and a half hour weigh the contents along with the stirrer. Add sufficient water to compensate for the loss of water during cooking. Cook it for another 10 minutes and determine the viscosity of the paste at the required temperature using suitable viscometer.

2.2 Chemical — The maize starch used as textile sizing and finishing material shall meet the following chemical requirements also:

Characteristic	*Requirement*	*Method of Test, Ref to*
Moisture content	13 percent, *Max*	IS : 4706-1968*
Starch content	98 percent, *Min*	
Ash content	0·25 percent, *Max*	
Protein content	0·60 percent, *Max*	
Free acidity	40 ml, *Max*	
*p*H	4·5, *Min*	
Petroleum-hydrocarbon extractable matter	0·25 percent, *Max*	Appendix B

2.3 If the original test specimens are analysed as such, in order to eliminate the time-consuming oven-drying, the observed mass should be corrected for moisture content while calculating the results.

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*Methods of test for edible starches.

AMENDMENT NO. 1 MARCH 1980
TO
IS:1184-1977 SPECIFICATION FOR MAIZE STARCH, COTTON TEXTILE INDUSTRY

(Second Revision)

Alterations

(*Page 4, clause 2.1, informal table, third column*) - Substitute 'IS:4706(Part I)-1978*' *for* 'IS:4706-1968*'.

(*Page 4, clause 2.2, informal table, third column*) - Substitute 'IS:4706(Part II)-1978†' *for* 'IS:4706-1968*'.

(*Page 4, foot-note with '*' mark*) - Substitute the following for the existing foot-note:

'*Methods of test for edible starches and starch products:Part I Physical methods (*first revision*).

†Methods of test for edible starches and starch products:Part II Chemical methods (*first revision*).'

(TDC 12)

AMENDMENT NO. 2 AUGUST 1983

TO

IS:1184-1977 SPECIFICATION FOR MAIZE STARCH, COTTON TEXTILE INDUSTRY

(Second Revision)

[This amendment is mainly issued to give values of viscosity which were given in the standard on tentative basis. The requirement of protein content is being deleted because it is considered as non-functional requirem ent when the starch is used in textile industry.]

Alterations

(*Page 4, clause 2.1*):

a) *First sentence* - Substitute the following for the existing sentence:

> 'The maize starch used as a textile sizing and finishing material shall be in the form of a fine white powder, free from black specks, dirt and other adventitious impurities. It shall meet the following physical requirements.'

b) *Informal table, second column, last entry* - Substitute '40 seconds' *for* '30 seconds'.

c) *Note 1* - Delete.

d) *Note 2* - Substitute the following for the existing note:

> 'Note - When Redwood Viscometer No. 1 is used for determination of viscosity,

the following method for preparation of paste shall be as follows:

Weigh 6.0 g of the dry material. Add this to a beaker containing 200 ml water, with continuous stirring. Weigh the beaker and the stirrer along with its contents. Keep the beaker in a boiling waterbath and cover with a plastic plate. Stir this with the paddle type mechanical stirrer at a speed of 45 to 50 rev/min. After one and a half hour weigh the contents along with the stirrer. Add sufficient water to compensate for the loss of water during cooking. Cook it for another 10 minutes and determine the viscosity of the paste.'

(*Page 4, clause 2.2, informal table, col 1 and 2, 4th entry*) - Delete.

(TDC 12)

Reprography Unit, BIS, New Delhi, India

AMENDMENT NO. 3 OCTOBER 1987

TO

IS:1184-1977 SPECIFICATION FOR MAIZE STARCH, COTTON TEXTILE INDUSTRY

(*Second Revision*)

(*Page* 6, *clause* 3.1) - Add the following in the end:

'The maize starch may also be packed in polyethylene lined high density polyethylene (HDPE) woven sacks conforming to IS:9755-1985||.'

(*Page* 6, *foot-notes*) - Add the following foot-note in the end:

'||High density polyethylene (HDPE) woven sacks for packing fertilizers (*first revision*).'

(TDC 12)

Reprography Unit, BIS, New Delhi, India

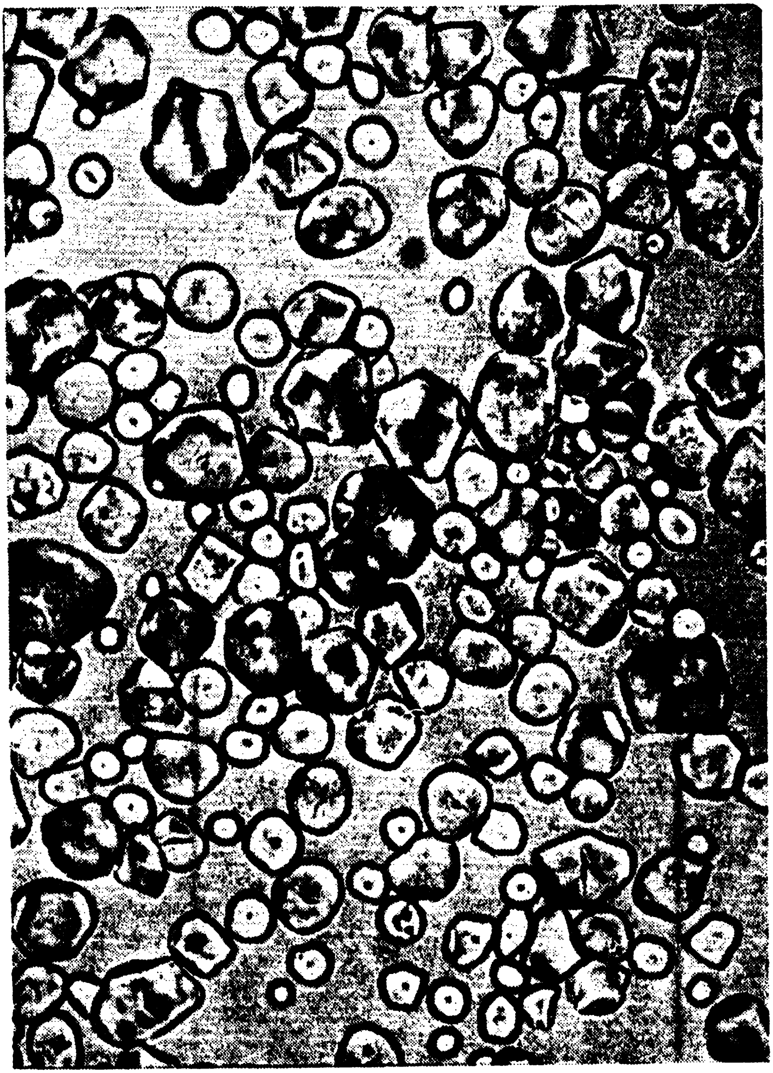

FIG. 1 PHOTOMICROGRAPH OF MAIZE STARCH (× 700)

3. PACKING

3.1 The maize starch should be packed in paper or polyethylene-lined jute bags preferably conforming to IS : 7406-1974*, IS : 8115-1976† or IS : 8117-1976‡, as laid in the contract.

4. MARKING

4.1 Each package shall be marked with the name and net mass of the contents (kg), name or trade-mark of the manufacturer and date of packing.

4.1.1 The package may also be marked with the Standard Mark.

NOTE — The use of the Standard Mark is governed by the provisions of the Bureau of Indian Standards Act, 1986 and the Rules and Regulations made thereunder. The Standard Mark on products covered by an Indian Standard conveys the assurance that they have been produced to comply with the requirements of that standard under a well defined system of inspection, testing and quality control which is devised and supervised by BIS and operated by the producer. Standard marked products are also continuously checked by BIS for conformity to that standard as a further safeguard. Details of conditions under which a licence for the use of the Standard Mark may be granted to manufacturers or producers may be obtained from the Bureau of Indian Standards.

5. SAMPLING

5.1 Procedure for sampling of maize starch for carrying out tests given in **2.1** and **2.2** shall be as given in IS : 4662-1977§ unless otherwise specified in the contract.

5.2 Starch content and particle size shall be tested on individual samples and the remaining characteristics on composite samples.

5.3 Criteria for Conformity

5.3.1 Where the value specified is maximum (mean + 0·5 range) shall not exceed specified value.

5.3.2 Where the value specified is minimum (mean — 0·5 range) shall not fall below the specified value.

---

*Specification for laminated jute bags for packing fertilizers.

†Specification for double hessian jute bags for pesticides.

‡Specification for DW tarpaulin laminated jute bags for pesticides.

§Methods for sampling of starch and starch products (*first revision*).

APPENDIX A

(*Clause* 0.3)

SI UNITS

TABLE 1 INTERNATIONAL SYSTEM OF UNITS

Base Units

QUANTITY	UNIT	SYMBOL
Length	metre	m
Mass	kilogram	kg
Time	second	s
Electric current	ampere	A
Thermodynamic temperature	kelvin	K
Luminous intensity	candela	cd
Amount of substance	mole	mol

Supplementary Units

QUANTITY	UNIT	SYMBOL
Plane angle	radian	rad
Solid angle	steradian	sr

Derived Units

QUANTITY	UNIT	SYMBOL	CONVERSION
Force	newton	N	1 N = 0·101 972 kgf
Energy	joule	J	1 J = 1N.m
Power	watt	W	1 W = 1 J/s
Flux	weber	Wb	1 Wb = 1V.s
Flux density	tesla	T	1 T = 1 Wb/m^2
Frequency	hertz	Hz	1 Hz = 1c/s (s^{-1})
Electric conductance	siemens	S	1 S = 1A/V
Pressure, stress	pascal	Pa	1 Pa = 1N/m^2

TABLE 2 RECOMMENDED SI UNITS FOR TEXTILES

SL No.	CHARACTERISTIC	SI UNIT		APPLICATION
		Unit	Abbreviation	
(1)	(2)	(3)	(4)	(5)
1)	Length	Millimetre	mm	Fibre
		Millimetre, centimetre	mm, cm	Samples and test specimens (as appropriate)
		Metre	m	Yarns, ropes and cordages, fabrics
2)	Width	Millimetre	mm	Narrow fabrics
		Centimetre	cm	Other fabrics
		Millimetre, centimetre	mm, cm	Samples and test specimen (as appropriate)
		Centimetre, metre	cm, m	Carpets, druggets, durries (as appropriate)
3)	Thickness	Micrometre (micron)	µm	Delicate fabrics
		Millimetre	mm	Other fabrics, carpets, felts
4)	Linear density	Tex	tex	Yarns
		Millitex	mtex	Fibres
		Decitex	dtex	Filament and filament yarns
		Kilotex	ktex	Slivers, ropes and cordages
5)	Diameter	Micrometre (micron)	µm	Fibres
		Millimetre	mm	Yarns, ropes, cordages
6)	Circumference	Millimetre	mm	Ropes, cordages
7)	Threads in cloth:			Woven fabrics (as appropriate)
	a) Length	Number per centimetre Number per decimetre	ends/cm ends/dm	
	b) Width	Number per centimetre Number per decimetre	picks/cm picks/dm	
8)	Warp threads in loom	Number per centimetre	ends/cm	Reeds
9)	Stitches in cloth:			Knitted fabrics (as appropriate)
	a) Length	Number per centimetre Number per decimetre	courses/cm courses/dm	
	b) Width	Number per centimetre Number per decimetre	wales/cm wales/dm	

(*Continued*)

TABLE 2 RECOMMENDED SI UNITS FOR TEXTILES — *Contd*

SL No.	CHARACTERISTIC	SI UNIT		APPLICATION
		Unit	Abbreviation	
(1)	(2)	(3)	(4)	(5)
10)	Stitch length	Millimetre	mm	Knitted fabrics Made-up fabrics
11)	Mass per unit area	Grams per square metre	g/m^2	Fabrics
12)	Mass per unit length	Grams per metre	g/m	Fabrics
13)	Twist	Turns per centimetre Turns per metre	turns/cm turns/m	Yarns, ropes (as appropriate)
14)	Test or gauge length	Millimetre, centimetre	mm, cm	Fibres, yarns and fabric specimens (as appropriate)
15)	Breaking load	Millinewton	mN	Fibres, delicate Yarns (skeins or individual)
		Newton	N	Strong yarns (individual or skeins), ropes and cordages, fabrics
16)	Breaking length	Kilometre	km	Yarns
17)	Tenacity	Millinewton per tex	mN/tex	Fibres, yarns (individual or skeins)
18)	Twist factor or twist multiplier	Turns per centimetre × square root of tex	$\text{turns/cm} \times \sqrt{\text{tex}}$	
		Turns per metre × square root of tex	$\text{turns/m} \times \sqrt{\text{tex}}$	Yarns (as appropriate)
19)	Bursting strength	Newton per square centimetre	N/cm^2	Fabrics
20)	Tear strength	Millinewton	mN	Fabrics (as appropriate)
		Newton	N	
21)	Pile height	Millimetre	mm	Carpets
22)	Pile density	Mass of pile yarn in grams per square metre per millimetre pile height	$g/m^2/mm$ pile height	Pile carpet
23)	Elastic modulus	Millinewton per tex per unit deformation	mN/tex/unit deformation	Fibres, yarns, strands

APPENDIX B

(*Clause* 2.2)

ESTIMATION OF PETROLEUM-HYDROCARBON EXTRACTABLE MATTER

B-1. ESTIMATION OF FAT CONTENT

B-1.1 Procedure — Weigh accurately about 5 g of the test sample in a thimble and mix with 5 g of purified coarse sand previouly extracted with petroleum-hydrocarbon solvent (60 to 80°C B.P.). Place a piece of absorbent cotton in the top portion of the thimble to distribute the solvent as it drops on the sample. Transfer the thimble to the Soxhlet extractor. Take adequate quantity of petroleum hydrocarbon in a tared Soxhlet extraction flask and assemble the Soxhlet extraction apparatus. Heat on a water-bath or electric hot plate at such a rate that the solvent will drop from the condenser on the centre of the thimble at the rate of at least 150 drops/min. Keep the volume of the solvent fairly constant by adding enough of petroleum-hydrocarbon to make up for any loss due to evaporation. Continue extraction for 2 hours. Remove the thimble from the apparatus after the extraction and distil the excess of solvent leaving about 25 ml of the solution in the flask. Transfer the solution to a tared 100-ml beaker. Evaporate the solvent in the beaker on a steam-bath followed by heating in an oven maintained at 100 ± 3°C for 30 minutes. Dry the extract to a constant mass.

B-2. Calculation

B-2.1 Petroleum-hydrocarbon extractable matter, percent by mass (on oven-dry mass basis) $= \frac{10\,000\, a}{b\,(100-M)}$

where

a = mass of the extract in grams,

b = mass of the sample taken in grams, and

M = moisture content, percent by mass of the sample.

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